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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/734,618
Filing Date: December 12, 2003
Appellant(s): KURZWEIL, RAYMOND C.

Denis G. Maloney
For Appellant

Supplemental
EXAMINER'S ANSWER

This is in response to the Patent Appeal Center correction filed June 23, 2010 identifying a discrepancy between the US patent number for Saylor in the Evidence Relied Upon section and the Grounds of Rejection section. The typographical error in Section 9. Grounds of Rejection, has been corrected to state the proper US patent number (Saylor US 7,466,827). The proper patent number was listed in the 892 Notice of References Cited mailed June 11, 2009, corresponding with the final office action that is on appeal. This does not constitute a new grounds of rejection as Applicant was fully aware of the proper US patent number, as indicated by Applicant's referral to the proper US patent number in the Remarks filed September 09, 2009.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,786,863	Abbasi	9-2004
6,016,385	Yee et al.	1-2000
7,466,827	Saylor et al.	12-2008
2002/0080094	Biocca et al.	1-2002
2003/0030397	Simmons	2-2003

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-10, 13-21, and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abbasi, US 6,786,863, in view of Yee, US 6,016,385, in view of Biocca, US 2002/0080094, and in further view of Saylor, US 7,466,827.

(Claim 1) Abbasi describes a virtual reality encounter system (a remote physical contact system) comprising: a surrogate (element 160); a camera coupled to the surrogate (camera 35A), the camera capturing an image of a first, physical location in which the surrogate is disposed (location of the user 10, column 4, lines 37-41), and producing a first video image signal from the first captured image ("video" shown in figure 5, column 2, lines 54-58); a processor that receives the first video image signal (computer 15, Figures 1 and 5, column 2, lines 54-58); an adapter (computer 15 connected to computer network 30, figure 1) to send the first video image signal to a communications network and sounds (network 30, figures 1 and 5), and receive a second, video image signal from the communications network, the second video image signal of a second, different physical location (graphic output at location 160, from signal from video signal transmitted from element 165, the location of user 20); and a video display (element 240) to render the second video image of the second, different

physical location (column 7, lines 22-37). Abbasi does not describe that the surrogate is a mannequin or wherein the remote displays are a set of goggles.

However, Yee teaches a remotely controlled robot by an operator reacting to feedback signals originating at the robot, the robot (second location surrogate) is a mannequin (humanoid robot or "antiphon", Figure 3); a camera coupled to the robot, capturing an image of a first, physical location (cameras 22, figure 1) and a set of goggles to display the second video image of the second, different physical location on a pair of displays that are integrated with the set of goggles (element 24, column 5, lines 11- 37: "A pair of video 'operator' screens 24 (FIG. 4) are mounted in the helmet 13"). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Yee with Abbasi because as Abbasi suggests the remote communication would be enhanced with the inclusion of tactile or other physical stimulus from one human user to another, which "enables people to expand on the notion of teleconferencing or computer communications by adding a capability to engage in all types of physical contact" (column 1, lines 60-63). Further Abbasi describes that the surrogate can be "any anatomical component" (column 2, lines 3-4) to create contact messages to reflect the physical state of the surrogate, therefore it would have been further obvious to one of ordinary skill in the robotic field to use the remote humanoid robotic control system of Yee, because the robot Yee teaches would allow the operator to sense the same environment of the robot in a natural fashion (column 1, lines 20-27). Further, Yee suggests using a pair of displays in the headset to

give a three-dimensional, thereby more realistic, image to the operator (column 5, lines 35-37).

Both Abbasi and Yee describe that an image is acquired by a remote camera at a second location, but neither describe wherein the video image signal is morphed. However, Biocca teaches a teleportal system to provide remote communication to a plurality of users, wherein a processor that receives a first video image signal, morphs the first video image signal and sends the morphed image signal to a second, physical location to be displayed ([0037]), wherein the display is integrated with the set of goggles (integrated with the headset of the user, [0045], [0050]). It would have been obvious to one of ordinary skill in the robotic and communication arts, to morph the acquired image because as Biocca suggests, morphing the image and overlaying the image allows the image to be perceived in a user preferred 3D or stereoscopic view that gives a more realistic view of the second location ([0038]-[0039]). Biocca teaches that it is an obvious variation to project the image on lens or displays coupled to the headgear, thus allowing the user to move outdoors ([0044], [0051]). In addition, Biocca teaches that it was very well known in the computer arts for a computer of a telecommunications system to comprise an adapter (modem 209) to connect to a network (Figure 2) as this was a standard means of connecting to a network data system.

Both Abbasi and Yee describe communicating sounds to the user that are received at a remote location, but neither expressly describes sending sounds in connection with a theme of a morphed image. However, Saylor teaches providing audio communications for a simulation system over a computer network wherein the sounds

are in connection with a theme of a virtual reality simulation system being displayed to a user (column 3, lines 39-47, line 63-column 4, line 3). It would have been obvious to one of ordinary skill in the remote communication arts to combine the teachings of Saylor with the invention of Abbasi, in view of Yee and Biocca, because Saylor teaches further means of achieving realism for a simulated environment, as the other references, by processing the audio signals to sound like the actual sound depending on the conditions/themes chosen by the user (column 1, lines 22-28).

(Claim 2) Biocca teaches a teleportal system to provide remote communication to a plurality of users, comprising a processor that overlays a virtual environment over one or more portions of the video image to form a virtual scene (figures 12B-D, [0012] lines 16-24, [0049] and [0050]). It would have been obvious to one of ordinary skill in the robotic or imaging arts to combine the teaching of Biocca with the invention of Abbasi in view of Yee because as Biocca suggests, morphing the image and overlaying the image allows the image to be perceived in a user preferred 3D or stereoscopic view that gives a more realistic view of the second location ([0038]-[0039]). Biocca teaches that it is an obvious variation to project the image on lens or displays coupled to the headgear, thus allowing the user to move outdoors ([0044], [0051]).

(Claim 3) Abbasi describes that the surrogate can be "any anatomical component" (column 2, lines 3-4), wherein the surrogate has tactile sensors positioned along the exterior of the surrogate ("first mechanical surrogate further comprises sensors that enable the mechanical surrogate to detect actions imparted onto it. Such actions could comprise ... physical displacement" Column 2, lines 4-8), the sensors

sending first tactile signals to the communications network (figure 4, signal coming from "s[u]rrogate" 160); the system further including: a body suit (hand interface 90, figure 3) having tactile actuators, the tactile actuators receiving second tactile signals from the communications network ("Each sleeve further comprises tactile sensors. These tactile actuators apply surface pressure to the fingers in the glove." Column 5, lines 37-38 and lines 45-50). Abbasi does not describe that the surrogate is a humanoid robot. However, Yee teaches that it was well known in the robotic art for a remotely controlled robot to be a humanoid robot (figure 3) having tactile sensors positioned along the exterior of the robot (column 7, lines 49-58) that are transmitted to the operator that have tactile actuators (column 4, lines 36-40) that receive tactile signals (column 4, lines 5-8 and column 8, lines 10-15). It would have been obvious to a person of ordinary skill in the robotic art at the time of the invention to combine Yee's teachings of a humanoid robot with the remote communications system of Abbasi, because as Yee teaches it would have been desirable to "project a human-like presence at locations remote from an operator who may sense the robot environment through sensing signal communicated by the robot to the operator... " to increase interest by the public and decrease intimidation (column 1, lines 40-45 and lines 49-55).

(Claim 4) Abbasi further describes motion sensors positioned throughout the body suit (interface 90), the motion sensors sending first motion signals corresponding to movements of each sensor relative to a reference point (column 5, lines 28-45), the first motion signals transmitted to the communications network (Figure 5); and wherein the surrogate is a first surrogate (Figure 1). Abbasi further describes the system

includes: second surrogate at a second location (surrogate 165), the second surrogate receiving, from the communications network (Figure 5), the first motion signals from the motion sensors (column 6, lines 17-42), the first motion signals from the motion sensors causing a movement of the second surrogate that is correlated to a movement of the body suit (column 6, lines 17-42). As stated previously, Abbasi does not explicitly describe the surrogates are humanoid robots. However a person of ordinary skill in the art at the time of the invention would have been motivated to substitute a full humanoid robot as taught by Yee with the surrogate of Abbasi, to increase interest and comfort by the public, and provide the user a more realistic remote experience (Yee: column 1, lines 30-55).

(Claim 5) Abbasi further describes that the second surrogate includes motion actuators corresponding to the motion sensors (Figure 4, "response actuator process" 145), the motion actuators causing the second surrogate to move (Figure 2, column 5, lines 10-26).

(Claim 6) Abbasi describes that the surrogate system includes a microphone (40A,B), the microphone for sending audio signals (Figure 5, audio signal shown as input to "sensor monitor process"), corresponding to sounds in the second physical location, to the communications network (column 2, lines 63-67). While Abbasi describes the surrogate can be "any anatomical component" (column 2, lines 3-4), Abbasi does not explicitly describe the surrogate is a humanoid robot comprising a body. However, Yee teaches wherein the humanoid robot comprises a body (element 34); a microphone coupled to the body, the microphone for sending audio signals

(column 4, line 51-column 5, line 10), corresponding to sounds in the second physical location, to the communications network (column 4, line 51-column 5, line 10). It would have been obvious to one of ordinary skill in the robotic art to combine the teachings of Yee with the invention of Abbasi because as Yee suggests, providing the humanoid robot with microphones coupled to the robot body provides the user with a directional input, "thereby providing a sense of direction to which the operator may respond by turning his head 'in the direction of the sound'" (column 5, lines 1-6).

(Claim 7) Abbasi describes the use of speakers to render the audio signals received from the communications network and in correspondence to the sounds from the second physical location (speakers 45A,B column 2, lines 59-67), but does not describe the utilization of a set of goggles including the transducers. Yee further teaches wherein the set of goggles further include a transducer to render the audio signals (receiver 20 which delivers the audio signal to earphone 19), received from the communication network, corresponding to the sounds in the second physical location (column 5, lines 1-10, figure 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Yee with the invention of Abbasi because as Yee suggests providing the sound output directly to the user's earphones in the virtual helmet provides a realistic sense of direction of the audio source (column 5, lines 1-6).

(Claim 8) Abbasi describes the system further comprising: a first microphone coupled to the first surrogate (microphone 40B); a second surrogate in the second location (surrogate 165), the second surrogate connected to a second microphone and

a second camera (microphone 40B, camera 35B, Figure 1); and a second display in the second location to receive the first video image signals (display on computer 25, "graphic output" in location 165) and a second speaker to receive the audio signals from the first microphone (speaker 45B). As stated previously, Abbasi does not explicitly describe a humanoid robot, wherein the sound, audio and imaging components are coupled or supported by the surrogates. However, Yee teaches a humanoid robot wherein the microphone is coupled to a humanoid robot (Figure 3, microphone 48), the robot supporting a microphone and a camera (camera 22, Figure 3); and a set of goggles to receive the video image signals and an earphone to receive the audio signals from the remote microphone (Figure 4, helmet 13 with earphones 19, screens 24). It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a humanoid robot that contained the sensory inputs and outputs for the second surrogate as this would be merely a duplication of the same structure at the first location, and provide the second user with the same virtual reality experience, in the natural fashion (Yee: column 1, lines 20-27) as experienced by the first user. As stated previously, neither Abbasi nor Yee describe morphing an image. However, Biocca teaches that it was known in the virtual reality and remote telecommunications art to morph an image being transmitted from a physical location to another physical location, the morphed image being received by a set of goggles ([0037], [0045]). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of receiving a morphed image at a remote location as suggested

by Biocca to allow the second user a more realistic view of the first location ([0038]-[0039]).

(Claim 9) Abbasi further describes the system comprises: a first communication gateway in a first location (computer 15); a second processor in the second location to process video from the second location (computer 25); and a second communication gateway in the second location (computer 25, Figure 1), the second processor connected to the first processor via the communications network (Figure 1, computer network 30).

(Claim 10) Abbasi further describes wherein the communications network comprises an interface having one or more channels (communications links, column 3, lines 6-8, Figure 5) for receiving the audio signals from the microphone (column 4, lines 37-39, microphone 40); receiving the video signal from the camera (column 4, lines 37-39, camera 35); sending the video signals to the display (figure 7, element 240); and sending the audio signals to the transducers (column 4, lines 37-40, speaker 45). As stated previously, Abbasi does not describe using goggles as a display. However the use of goggle displays instead of a GUI on the computer screen would have been an obvious substitution of one known display element for another to obtain predictable results according to the known functions of each element.

(Claim 13) Abbasi does not describe the display comprises a wireless receiver to wirelessly receive the transmitted image data. However, Yee teaches wherein the set of goggles comprises a wireless receiver (column 9, lines 9-11) to receive and send signals between the robot and the control module. Further Biocca teaches the head

display receiving a morphed video image further may connect to the networked computers via a wireless connection ([0035]). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Yee and Biocca with the invention of Abbasi because, as indicated by Yee and Biocca, wireless communication and wired communications were known substitutes for yielding the same result of transmitting data. Biocca further illustrates that wireless communication would provide the advantage of allowing the user to move unrestrictedly ([0048]).

(Claim 14) Abbasi does not describe wherein the surrogate has a wireless transmitter. However, Yee teaches the robot comprises a transmitter (communications antenna 30) to wirelessly send the audio signals, tactile signals, the motion signals, and the video image to the communications network (Figure 3, column 9, lines 9-11). It would have been obvious to one of ordinary skill in the art to modify the surrogate of Abbasi with the teachings of Yee to allow the surrogate to move, unrestricted by wires, and be transportable by the second user.

(Claim 15) Abbasi describes a method of having a virtual encounter, comprising: receiving a first video image from a camera coupled to a surrogate (column 4, lines 37-41, camera 35A), the surrogate disposed in a first physical location (element 160, location of user 10); sending the first video image over a communications network (network 30) and sounds in connection with the video image (Figures 1, 5 and 6, "create contact message" step 210, "transmit to remote site" step 215, column 2, lines 54-58); receiving a second video image from a camera coupled to a second surrogate disposed in a second physical location (Figure 7, video display 240, column 7, lines 22-37).

Abbasi does not describe wherein the surrogate is a mannequin or that the video image display is a set of goggles, wherein the displays are integrated with the set of goggles.

However, Yee teaches a method of operating a teleoperated robot, wherein the robot is a mannequin (humanoid robot or "antiphon", Figure 3), rendering a video image using a set of goggles to display the second video image of the second, different physical location on a pair of displays that are integrated with the set of goggles (element 24, column 5, lines 11- 37: "A pair of video 'operator' screens 24 (FIG. 4) are mounted in the helmet 13"). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Yee with Abbasi because as Abbasi suggests the remote communication would be enhanced with the inclusion of tactile or other physical stimulus from one human user to another, which "enables people to expand on the notion of teleconferencing or computer communications by adding a capability to engage in all types of physical contact" (column 1, lines 60-63). Further Abbasi describes that the surrogate can be "any anatomical component" (column 2, lines 3-4) to create contact messages to reflect the physical state of the surrogate, therefore it would have been further obvious to one of ordinary skill in the robotic field to use the remote humanoid robotic control system of Yee, because the robot Yee teaches would allow the operator to sense the same environment of the robot in a natural fashion (column 1, lines 20-27). Further, Yee suggests using a pair of displays in the headset to give a three-dimensional, thereby more realistic, image to the operator (column 5, lines 35-37).

Neither Abbasi nor Yee describe morphing the first video image. However, Biocca teaches a method of telecommunication, wherein a first video image is morphed ([0037]) and displayed on a display that is integrated with a set of goggles (integrated with the headset of the user, [0045], [0050]). It would have been obvious to one of ordinary skill in the robotic and communication arts, to morph the acquired image because as Biocca suggests, morphing the image and overlaying the image allows the image to be perceived in a user preferred 3D or stereoscopic view that gives a more realistic view of the second location ([0038]-[0039]).

Both Abbasi and Yee describe communicating sounds to the user that are received at a remote location, but neither expressly describes sending sounds in connection with a theme of a morphed image. However, Saylor teaches providing audio communications for a simulation system over a computer network wherein the sounds are in connection with a theme of a virtual reality simulation system being displayed to a user (column 3, lines 39-47, line 63-column 4, line 3). It would have been obvious to one of ordinary skill in the remote communication arts to combine the teachings of Saylor with the invention of Abbasi, in view of Yee and Biocca, because Saylor teaches further means of achieving realism for a simulated environment (overlaying "desired background noise, in addition to the communicated voice audio, such as engine noise, wind noise, artillary noise, etc." column 4, lines 1-3), as the other references, by processing the audio signals to sound like the actual sound depending on the conditions/themes chosen by the user (column 1, lines 22-28).

(Claim 16) Biocca further teaches overlaying a virtual environment over one or more portions of the video image to form a virtual scene (figures 12B-D, [0012] lines 16-24, [0049] and [0050]). It would have been obvious to one of ordinary skill in the robotic or imaging arts to combine the teaching of Biocca with the invention of Abbasi in view of Yee because as Biocca suggests, morphing the image and overlaying the image allows the image to be perceived in a user preferred 3D or stereoscopic view that gives a more realistic view of the second location ([0038]-[0039]).

(Claim 17) Abbasi further describes wherein the surrogate can be "any anatomical component" (column 2, lines 3-4), the method further comprising: sending first tactile signals from the surrogate to the communications network (figure 4, signal coming from "s[u]rrogate" 160), from tactile sensors positioned along the exterior of the surrogate ("first mechanical surrogate further comprises sensors that enable the mechanical surrogate to detect actions imparted onto it. Such actions could comprise ... physical displacement" Column 2, lines 4-8); receiving second tactile signals from the communications network at a body suit (hand interface 90, figure 3) in the first location, the body suit having tactile actuators responsive to the second tactile signals ("Each sleeve further comprises tactile sensors. These tactile actuators apply surface pressure to the fingers in the glove." Column 5, lines 37-38 and lines 45-50). Abbasi does not describe that the surrogate is a humanoid robot. However, Yee teaches that it was well known in the robotic art for a remotely controlled robot to be a humanoid robot (figure 3) having tactile sensors positioned along the exterior of the robot (column 7, lines 49-58) sending the tactile sensor signals to the operator that have tactile actuators (column 4,

lines 36-40) that receive tactile signals (column 4, lines 5-8 and column 8, lines 10-15). It would have been obvious to a person of ordinary skill in the robotic art at the time of the invention to combine Yee's teachings of a humanoid robot with the remote communications system of Abbasi, because as Yee teaches it would have been desirable to "project a human-like presence at locations remote from an operator who may sense the robot environment through sensing signal communicated by the robot to the operator... " to increase interest by the public and decrease intimidation (column 1, lines 40-45 and lines 49-55).

(Claim 18) Abbasi further describes sending first motion signals from motion sensors positioned over the surface of the human (column 5, lines 28-45, from interface 90), the first motion signals corresponding to movements of sensors relative to a reference point (column 5, lines 28-45), the first motion signals being transmitted to a communications network (Figure 5).

(Claim 19) Abbasi further describes receiving, at the surrogate, second motion signals sent by motion sensors disposed in a second, different physical location (column 5, lines 29-36 and column 6, lines 17-42); and causing a movement of the humanoid robot that is correlated to a movement of the human based on the second motion signals received from the motion sensors (column 6, lines 17-42), wherein receiving comprises receiving motion signals from the motion sensors at corresponding motion actuators coupled to the humanoid robot causing the humanoid robot to move ("second mechanical surrogate comprises actuators that enable it to mimic the actions imparted onto the first mechanical surrogate" column 2, lines 17-19, column 6, lines 17-42).). As

stated previously, Abbasi does not explicitly describe the surrogates are humanoid robots. However a person of ordinary skill in the art at the time of the invention would have been motivated to substitute a full humanoid robot as taught by Yee with the surrogate of Abbasi, to increase interest and comfort by the public, and provide the user a more realistic remote experience (Yee: column 1, lines 30-55).

(Claim 20) Abbasi further describes sending first audio signals over the communications network (Figure 5, audio signal shown as input to "sensor monitor process"), the audio signals being produced from a microphone coupled to the surrogate in the first physical location (microphone 40A,B, column 2, lines 63-67); and transducing second audio signals received from the communications network using speakers (speakers 45A,B column 2, lines 59-67), the second audio signals from a second, different physical location (column 2, lines 59-67). Abbasi does not describe the utilization of a set of goggles including the transducers. Yee further teaches wherein the set of goggles further include a transducer to render the audio signals (receiver 20 which delivers the audio signal to earphone 19), received from the communication network, corresponding to the sounds in the second physical location (column 5, lines 1-10, figure 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Yee with the invention of Abbasi because as Yee suggests providing the sound output directly to the user's earphones in the virtual helmet provides a realistic sense of direction of the audio source (column 5, lines 1-6).

(Claim 21) Abbasi further describes sending the second audio signals to the communication network from a second microphone couples to a second surrogate

(microphone 40A, column 4, lines 37-40); sending the second video image to the communications network from a second camera coupled to the second surrogate ("video" input to "sensor monitor process" of element 165 from camera 35B, Figure 5); rending the second image received from the communications network onto a monitor coupled to the second display (Figure 7, element 240, column 4, lines 37-39); and transducing the audio signals received from the communications network using a second transducer (column 4, lines 37-40, speaker 45). As stated previously, Abbasi does not describe using goggles as a display or using a humanoid robot. However the use of goggle displays instead of a GUI on the computer screen would have been an obvious substitution of one known display element for another to obtain predictable results according to the known functions of each element. Further, a person of ordinary skill in the art at the time of the invention would have been motivated to substitute a full humanoid robot as taught by Yee with the surrogate of Abbasi, to increase interest and comfort by the public, and provide the user a more realistic remote experience (Yee: column 1, lines 30-55).

(Claim 24) As previously stated, Abbasi does describe receiving video images, but does not describe using a set of goggles or that the image is morphed. However, Yee teaches wherein the set of goggles comprises a receiver to receive video images (column 9, lines 9-11). Further, Biocca teaches using a set of goggles (Figure 13) comprising a receiver to receive morphed video images ([0035] and [0037]-[0040]). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Yee and Biocca with the invention of Abbasi because, as

indicated by Yee and Biocca, placing the receiving for the image signals in the headset device of the user allows the user to move unrestrictedly (Biocca: [0048]).

(Claim 25) Abbasi does not describe wherein the surrogate has a wireless transmitter. However, Yee teaches the robot comprises a transmitter (communications antenna 30) to wirelessly send the audio signals and the video image to the communications network (Figure 3, column 9, lines 9-11). It would have been obvious to one of ordinary skill in the art to modify the surrogate of Abbasi with the teachings of Yee to allow the surrogate to move, unrestricted by wires, and be transportable by the second user.

(Claim 26) Neither Abbasi nor Yee describe wherein the goggles receive a morphed second video image from the processor. However, Biocca teaches receiving a morphed second video image from a processor ([0038], during the communication images are morphed with each subsequent received video image signal). Biocca suggests morphing the image and overlaying the image allows the image to be perceived in a user preferred 3D or stereoscopic view that gives a more realistic view of the second location and presenting various 3D structures in a personal and correct perspective viewpoint ([0038]-[0039]). Further it would have been very obvious to one of ordinary skill in the communication arts to duplicate the morphing process for a second image following a first image or an image discontinuous to the first (Biocca example of viewing a person's body discontinuously), this would have provided the predictable result of the stereoscopic or overlaid view, as suggested by Biocca, but merely as separate image signals.

Claim Rejections - 35 USC § 103

Claims 11, 12, 22, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abbasi in view of Yee, Biocca, and Saylor as applied to claims 7 and 20 above, and further in view of Simmons, US 2003/0030397.

(Claims 11 and 22) Abbasi in view of Yee, Biocca, and Saylor describe the system and method of a virtual reality encounter system as applied previously. Neither Abbasi, Yee, Biocca nor Saylor teach that the body of the robot includes that the cameras are positioned in the eye sockets. However, Simmons teaches a system and method of controlling a robot remotely, wherein the robot is a humanoid robot (figure 5); the robot includes an eye socket and the camera is positioned in the eye socket ([0026]).

(Claims 12 and 23) Neither Abbasi, Yee, Biocca nor Saylor teach that the body of the robot includes that the microphone of the robot is positioned in the ear canal. However, Simmons teaches a system and method of controlling a robot remotely, wherein the robot is a humanoid robot (figure 5); the robot includes an ear canal wherein the microphone is positioned in the ear canal ([0016]).

It would have been obvious to one of ordinary skill in the art to combine the invention of Abbasi in view of Yee, Biocca, and Saylor with the teachings of Simmons because as Simmons suggest, placing the sensors in the position corresponding to the human sensors aligns the sensors to the perspective of the use and better reflects the environment to the perspective of the user ([0026]) thereby giving a more realistic perception.

(10) Response to Argument

(1) Claims 1-10, 13-21, and 24-26 are properly rejected as being unpatentable over the Abbasi, Yee, Biocca, and Saylor.

Claims 1 and 15

(a) The combined references properly read on the claim limitation "sounds in connection with a theme of a morphed, first video image signal".

Applicant contends the applied reference Saylor, in combination with Abbasi, Yee and Biocca, does not teach sending sounds in connection with a theme of a morphed, first video signal. Particularly, Applicant contends Saylor merely "processes radio communications used in a flight simulation system to introduce impairment effects for aural realism" and does not teach sending sounds in connection with a theme of a morphed image. (Brief, pg 8.) Applicant further contends the rejection does not consider the full claim language, but misreads the claimed limitation.

The Examiner respectfully disagrees with the Applicant's characterization of Saylor's teachings and with the characterization of the applied rejection. The claimed limitation "sounds in connection with a theme of the morphed, first video image signal" was rejected under the combination of Abbasi, Yee, and in particular, Biocca and Saylor. It is noted that the claim limitation "a theme" is not narrowly claimed; under the broadest reasonable interpretation the claim requires merely that the sent sounds are in connection with the subject of (as a common definition of "theme") the morphed image.

Saylor teaches simulation system wherein interrelated audio, visual (imaging), and tactile simulations are sent to the simulation user (column 4, lines 59-61). Saylor

teaches sending a sound signal that has been modified in connection with the simulated conditions: "For example, for simulating aircraft audio communications, an aircraft may be flying at a certain speed and be a certain distance away from a control tower with which it is communicating. The speed and distance may be used as parameters to the model, which will process the audio data differently depending on these parameters." (Column 4, lines 4-15.) Saylor teaches that the purpose of is to provide sounds that are in connection with the simulated visual images and simulated environment, such as the cockpit of an aircraft: it was known to provide simulated environments with a "great 'look and feel', but lack a meaningful aural experience." (Column 1, lines 19-21.) In addition to sending replicated sounds in connection with the particular simulation theme, Saylor teaches sending audio sounds that include "any desired background noise, in addition to the communicated voice audio, such as engine noise, wind noise, artillary noise, etc" (column 4, lines 1-3).

Applicant appears to argue as if only Saylor was used to reject the claimed limitation; this is an incorrect reading of the rejection. Saylor is applied to teach the claimed feature of sending sounds in connection with a theme of a first video image signal. Biocca teaches that that first video image signal is morphed. Saylor suggests sending sounds in connection with the simulation being displayed and felt (visual and tactile signals) by modifying the real-time voice communications and adding background noises to simulation to improve the simulation experience. Biocca teaches morphing a sent video image to provide a user improved visual data, "such that each user experiences a prospectively correct viewpoint on an augmented reality scene."

(Paragraph [0037].) It would have been obvious to a person of ordinary skill in the art to combine the means of improving the virtual reality experience (computer-simulated environment) as taught by both Biocca, to improve the visual experience by morphing the video images, and Saylor suggests to one of ordinary skill that sending sounds in connection with the video image being displayed to the user provides a more realistic interaction, particularly more realistic audio stimuli, for the user. The combination of Biocca and Saylor with the invention of Abbasi in view of Yee, does not change the functionality of the known elements.

Applicant has provided no persuasive evidence that the combination of the conventional and known elements is uniquely challenging or difficult for one of ordinary skill in the art. Nor has Applicant argued or provided persuasive evidence that the combination of conventional technology, conventional morphing techniques in combination with a known means of improving audio simulations by sending audio signals in connection with a simulated environment, would yield unexpected results. Therefore, in view of the motivation to combine the references by the prior art takes as a whole, and based on the common knowledge and common sense of the person of ordinary skill in the art, the combination of references properly reads on the broadest reasonable interpretation of the claim language.

(b) The rejection under 35 U.S.C. 103(a) of claims 1 and 15 over the combination of Abbasi, in view of Yee, Biocca, and Saylor establishes a *prima facie* showing of obviousness.

Applicant contends the applied rejection is based on improper *ex post* reasoning and impermissible hindsight. Applicant appears to contend there is inadequate support for the motivation of combining the applied references, particularly in view of Applicant's contention that the references are directed to different subject areas of technology.

The Examiner respectfully disagrees.

In response to Applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). Here the level of ordinary skill in the relevant art at the time of the invention was high. The determination of the level of ordinary skill is determined in consideration of the types of problems encountered in the virtual reality and telepresence arts, including problems of improving realism, improving functionality, improved interaction with others, overcoming telecommunication delays, etc., the sophistication of the technology used, such as robotics (shown in Abbasi and Yee), telecommunications, computer imaging, etc., rapidity in which innovations are made, and education level of active workers in the field. Each of the applied references teaches techniques that were known in the prior art. The Court noted in KSR v Teleflex Inc., 550 U.S. 398, 402 "if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize

that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond that person's skill." Here the techniques used to improve the realism in augmented-reality and simulation systems would have been recognized by one of ordinary skill in the art to improve a telecommunication system of Abbasi. Applicant has provided no persuasive evidence that the combination of the conventional and known elements is uniquely challenging or difficult for one of ordinary skill in the art.

In response to Applicant's contention that there is inadequate support for the combination of the applied reference, the Examiner disagrees. The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. In re Keller, 642 F. 2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). In this regard, a conclusion of obviousness may be based on common knowledge and common sense of the person of ordinary skill in the art without any specific hint or suggestion in a particular reference. In re Bozek, 416 F .2d 1385, 1390, 163 USPQ 545, 549 (CCPA 1969). As provided in the Grounds for Rejection above, rational for the combination of each reference to the primary reference is provided for the particular claim limitation addressed.

In response to applicant's argument that the applied re is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's

endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, the field of applicant's endeavor is identified in the preamble as virtual reality. The field of virtual reality technology is used to create an artificial or computer based environment which is experienced by sensory stimuli. Each prior art reference applied in the rejection falls within this field of technology: Abbasi pertains to remote physical contact of a communication network, such as the Internet; Yee pertains to remote operation of a robot to project a "human-like presence at locations" (column 1, lines 40-47); Biocca pertains to improved teleconferencing in a networked virtual reality environment ([0003]); and Saylor pertains to improving the audio stimuli of "simulating real world situations" (column 1, lines 6-8). Further Applicant's own Background of the invention indicates that the prior art is not limited only to a narrow reading, as Applicant cites the development of the telephone, "teleconferencing and Internet cameras" as the background of the invention (Specification, page 1, lines 9-16).

In view of the interrelated teaching of the prior art, in consideration of the high level of skill of an ordinary artisan in the art, and the motivations provided by the prior art that support the applied combination, the applied rejection properly establishes a *prima facie* case of obviousness.

Claims 2 and 16

Applicant contends the applied references do not describe or teach the claim limitation that "the processor overlays a virtual environment over one or more portions of

the video image to form a virtual scene." (Brief, page 12.) Applicant does not argue a particular interpretation of the claimed limitation, merely that the references do not disclose them.

The Examiner respectfully disagrees. Biocca teaches specifically "an augmented reality [virtual] display ... [that] has the capability to display virtual objects and environments, superimpose virtual objects on the 'real world' scenes" ([0009]). Under the broadest reasonable interpretation of "a virtual environment" the described step of superimposing virtual objects on the user's real world view (figures 12B-D) creates an augmented reality, or virtual, scene.

Claims 3 and 17

Applicant contends the applied references do not describe or teach a body suit or the use of a body suit with tactile actuators receiving tactile signals from the communications network. (Brief page 14).

The Examiner respectfully disagrees. Based on the broadest reasonable interpretation of the term "body suit" Abbasi reads on the claim language by describing a hand interface 90 that acts as a "complimentary surrogate apparatus" comprises "tactile actuators...tactile actuators apply surface pressure to the fingers in the glove" (column 5, lines 27-39). Abbasi shows in Figure 5 the actuator signals are sent from communications connections from a first location 160 to a second location 165 "Response Actuator Process" 145, to the surrogate 165.

Claims 4 and 18

Applicant contends the applied references does not describe or teach motion sensors positioned throughout a body suit, the motion sensors sending first motion signals corresponding to movements of each sensor relative to a reference point. Particularly Applicant argues the reference Abbasi merely describes a glove (Brief page 16).

The Examiner respectfully disagrees. Based on the broadest reasonable interpretation of the term "body suit", the hand interface 90, which covers a portion of the user's body with a suit/fabric, the applied references read on the claim language. Abbasi describes the hand interface wherein "[e]ach sleeve further comprises a plurality of displacement sensors 105. The displacement sensors detect movement of the user's fingers in the glove." (Column 5, lines 60-36.)

Claim 26

Applicant contends the grounds of rejection do not address the claimed limitation of Claim 26.

The Examiner respectfully disagrees. Claim 26 has been rejected under Abbasi in view of Yee, Biocca and Saylor, with Biocca particularly teaching receiving a morphed second video image from a processor ([0038], during the communication images are morphed with each subsequent received video image signal). Biocca suggests morphing the image and overlaying the image allows the image to be perceived in a user preferred 3D or stereoscopic view that gives a more realistic view of the second location and presenting various 3D structures in a personal and correct perspective viewpoint ([0038]-[0039]). Further it would have been very obvious to one of ordinary

skill in the communication arts to duplicate the morphing process for a second image following a first image or an image discontinuous to the first (Biocca example of viewing a person's body discontinuously), this would have provided the predictable result of the stereoscopic or overlaid view, as suggested by Biocca, but merely as separate image signals.

(2) Claims 11, 12, 22, and 23 are properly rejected as being unpatentable over Abbasi in view of Yee, Biocca, and Saylor as applied in claims 7 and 20, and in further view of Simmons.

Applicant appears to contend Claims 11, 12, 22 and 23 were improperly rejected on the basis that Saylor was omitted from the heading and not mentioned in the rejections. The Examiner respectfully disagrees. The omission of Saylor from the heading and formal statements was an unintentional and incidental typographical error. The typographical error was rectified in the Grounds for Rejection above. However, the rejection of claims 11, 12, 22, and 23 was clearly on the bases of the teachings of Simmons and the mistake does not affect the substance of the rejection.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Christine M. Behncke/

Examiner, Art Unit 3661

/Thomas G. Black/

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